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Thermal Conductivity Detector on a 6820 GC, Accessory G4313A

Installation Guide

This installation guide provides procedures for installing a Thermal Conductivity Detector (TCD) on an Agilent 6820 Gas Chromatograph (GC). Before following these procedures, refer to safety information at the end of this document.

Parts list

Description	Quantity
T-20 Torx screw 4M	1
Screw M4 12 mm	3
Cable tie 100 × 3 mm	4
3-way switching valve cable	1
TCD sticker - English	1
TCD sticker - Chinese	1
Nutwarmer cup assembly	1
Insulation	1
Bottom insulation cup	1
Top insulation cup	1
Capillary inlet sticker for flow module - English	1
Capillary inlet sticker for flow module - Chinese	1
TCD body	1
TCD BD/D part	1
TCD ship kit	1

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Tools

- Electrostatic protection such as a grounded wrist strap
- T-20 and T-10 Torx screwdrivers
- Diagonal cutter
- Small flat-blade screwdriver
- 7/16-inch wrench

Configuration considerations

To achieve a standard factory configuration, it may be necessary to move an already existing detector. For a two-detector configuration, factory placement rules are as follows:

- A TCD is always placed in the front location.
- A flame ionization detector (FID) is always placed in the back location.

Steps

1. Preparing the GC
2. Positioning and Securing the Detector
3. Connecting the Detector
4. Installing the Flow Control Module
5. Installing the Switching Valve Extension Cable
6. Restoring the GC to Operating Condition

Preparing the GC

WARNING **Hazardous voltages are present in the mainframe when the GC is connected to electrical power. Avoid potentially dangerous shock hazards by disconnecting the power cord before removing the side panels.**

1. Switch off electrical power to the GC and disconnect the power cord. Allow time for the oven and heated zones to cool. Then switch off supply gases at their sources.
2. Remove column(s) and any associated hardware from inside the column oven.
3. Lift the hinged GC top cover at its front edge to expose the detector area. Remove the cover by raising it to vertical, lifting its left hinge pin from its bracket, and then sliding the cover to the left to free its right hinge pin.
4. Remove two screws along the lower edge of the left side (flow control) panel. Slide the panel slightly to the rear and lift it off.

CAUTION Electronic components can be damaged by static electricity: use a properly grounded static control wrist strap when removing the electronics panel.

5. In the same manner, remove two screws along the lower edge of the right side (electronics) panel. Slide the panel slightly to the rear and lift it off.
6. Remove the back panel by removing two screws at its bottom edge, loosening two screws at its top edge, and the lifting off the two top screws.

7 Finally, remove the rear top cover by removing four screws, two at each end.

8 At this time, if necessary to achieve a standard factory configuration, completely remove and reinstall an existing detector into its required location. If an existing detector is being completely replaced by this new detector, carefully store the old detector assembly and all associated parts in a safe place for possible future use.

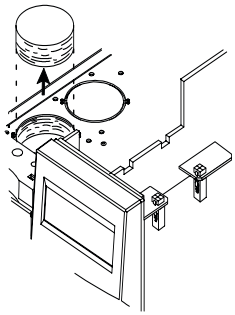
Positioning and Securing the Detector

CAUTION It is neither necessary nor advisable to separate a detector from its flow control module, as doing so may cause leaks. Although handling the detector and connected flow module as a unit is awkward, it can be managed.

1 If necessary, remove the round metal cutout on the oven top in the detector position to be used. Cut the metal circle with diagonal cutters so its nibs are connected to the piece removed. Discard the cutout.

CAUTION GC insulation is made of refractory ceramic fibers. Ventilate your work area. Wear long sleeves, gloves, safety glasses, and a disposable dust/mist respirator. Dispose of unneeded insulation in a sealed plastic bag.

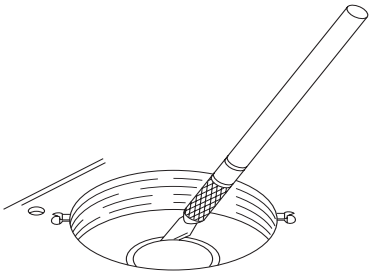
2 If necessary, lift out the die-cut insulation plug from the detector position to be used.



CAUTION Be careful to remove only insulation within the scribed circle.

3 Carefully remove the scribed circle of insulation from the oven top to create an opening into the oven.

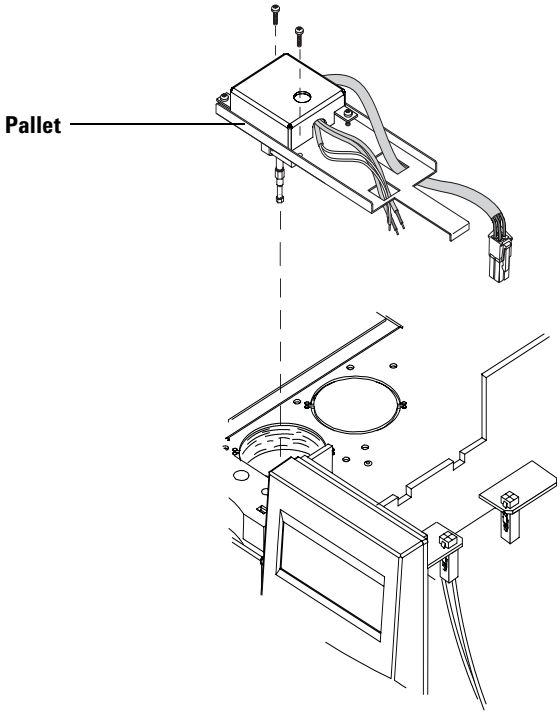
Method 1: Use a sharp knife to cut out insulation using the scribed circle as a guide.



Method 2: Pierce the insulation with a screwdriver. Rotate the screwdriver around the edge of the scribed circle to remove excess insulation. Remove any pieces of insulation which fall inside the oven.

4 While positioning the detector into the cavity, use both supplied insulation and removed oven insulation to pack around the bottom and sides of the detector. The goal is to fill

all voids around the detector body as it is placed into the cavity.



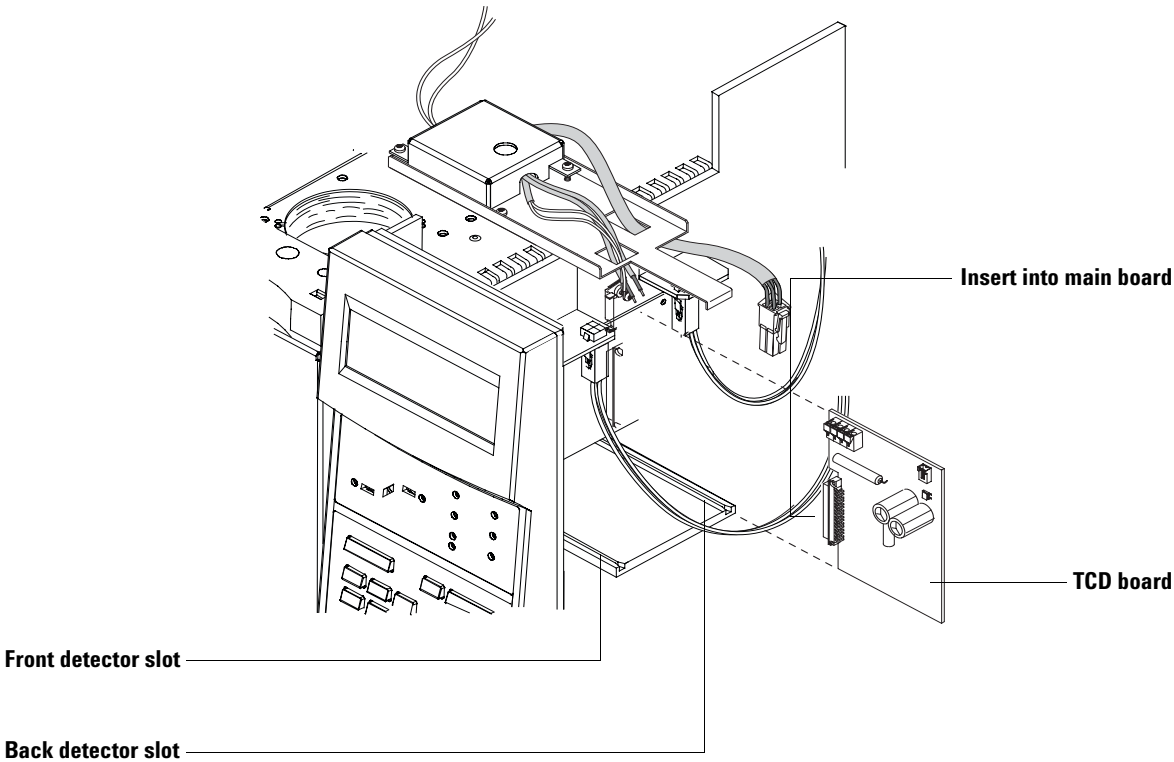
5 Partially tighten the pallet screws with a T-20 Torx screwdriver, then tighten them evenly.

Connecting the Detector

CAUTION Printed circuit board components can be damaged by static electricity; use a properly grounded static control wrist strap when handling the detector board.

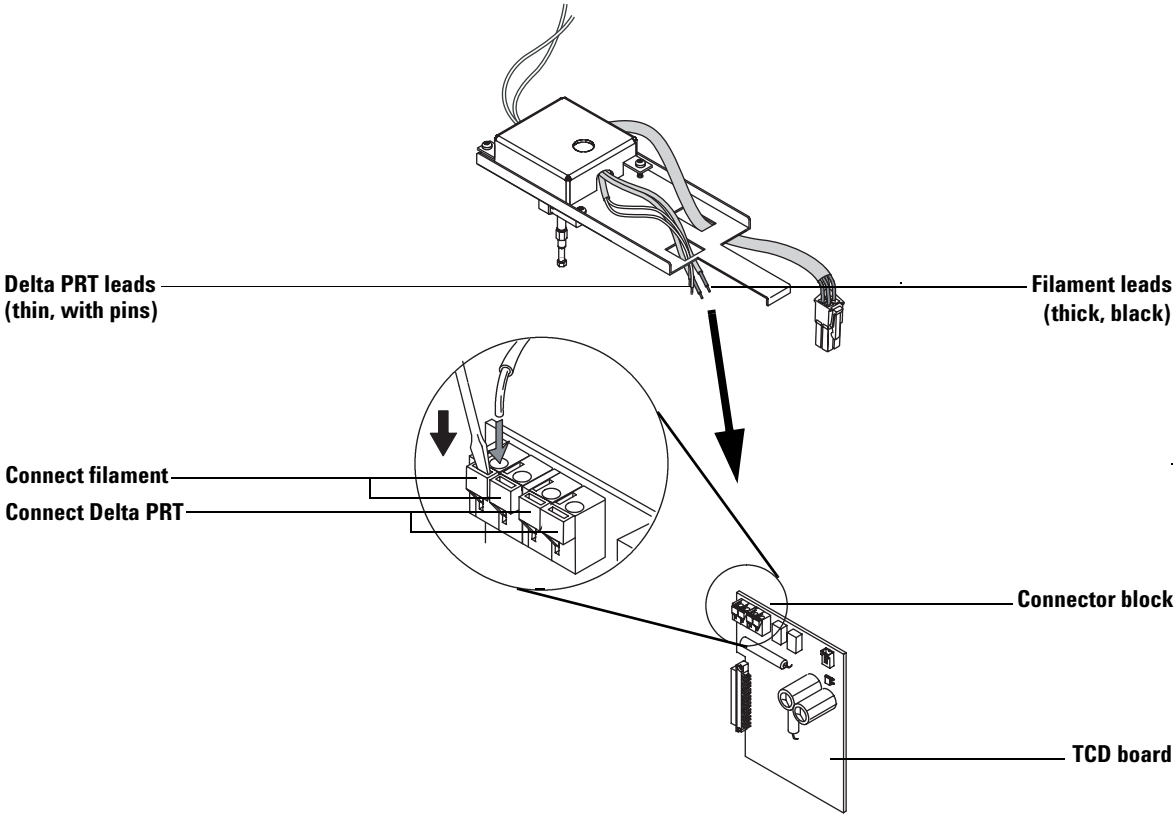
1 Remove the PC board from its antistatic bag and slide it fully into the slot and main circuit board connector associated

with the installed detector. The top of the board should be aligned with the slot on the TCD pallet.



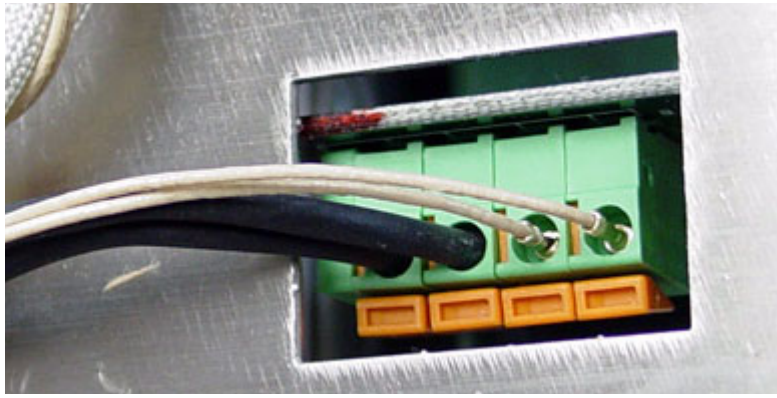
2 Attach filament leads to the TCD board into the two left-most positions of the connector block. Insert a small flat-blade screwdriver into the rectangular slot and push downward

while inserting each filament lead fully into the correct round hole. Polarity does not matter.

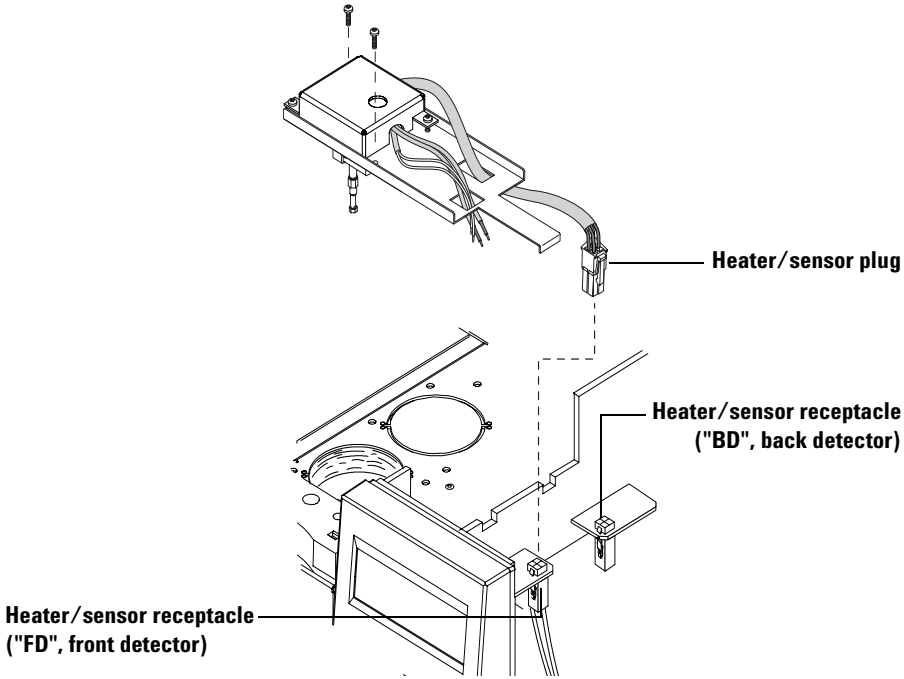


CAUTION If Delta PRT sensor leads are not properly connected to the TCD connector block, filament burnout may occur.

3 In the same manner, connect the Delta PRT leads to the two right-most positions in the connector block. Polarity does not matter.



4 Connect the heater/sensor plug to the square receptacle closest to the installed detector ("FD" for front detector, or "BD" for back detector).



Installing the Flow Control Module

This section describes installation of the detector flow control module.

CAUTION It is neither necessary nor advisable to separate a detector from its flow control module, as doing so may cause leaks. Although handling the detector and connected flow module as a unit is awkward, it can be managed.

1 Determine the correct location for the detector flow control module:

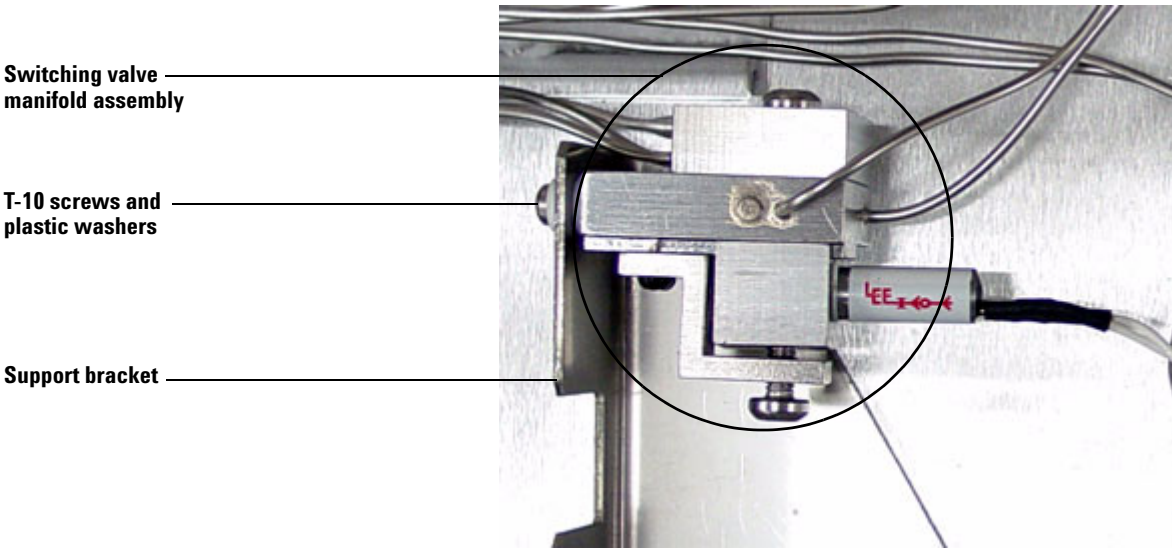
- **Detector in the front position–** use the upper detector flow control module location.
- **Detector in the back position–** use the lower detector flow control module location.

CAUTION Handle the module carefully to avoid damaging its components and/or connected tubing.

2 Starting from the detector, the tubing between the detector and its switching valve manifold assembly should remain located within the front oven top area. This makes it possible to remove the detector cell itself for servicing and/or replacement at a later time without having to remove instrument side and back panels.

3 Secure the switching valve manifold assembly to the support bracket on top of the oven using two T-10 screws and plastic washers. If necessary, temporarily remove the bracket from

the oven top to secure the manifold block, then resecure the bracket.



View from right (electronics) side

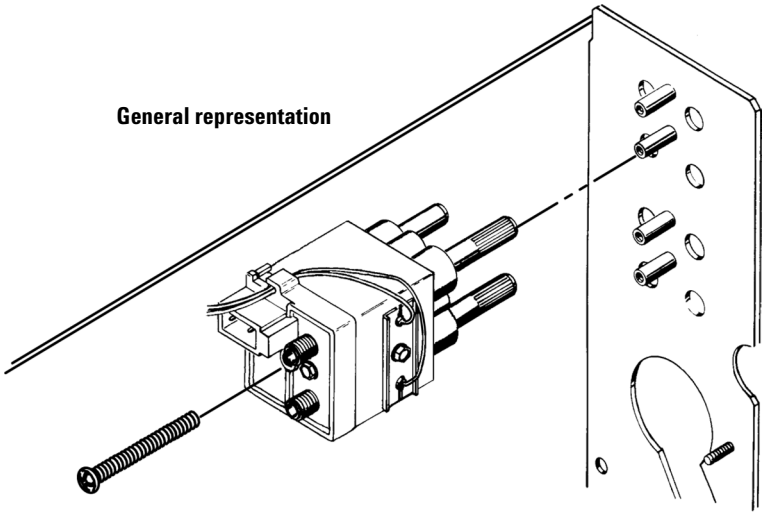
4 Route gas supply tubing from the switching valve manifold assembly through either slot at the back of the oven top, then alongside existing tubing and wiring located behind the oven top, and finally into the flow control (left) portion of the GC. Avoid making sharp bends in the tubing.

5 Route the flow control module to the appropriate location at the front panel in the flow control portion of the GC.

6 Remove the existing detector label plate from the module location to be used and install the new one provided.

7 Verify that the two valves on the flow module are in their respective midway positions (rotated fully clockwise to a stop, then rotated two to three turns counterclockwise), and then slide the module onto two studs provided at the rear of the flow panel.

8 Secure the module with a 1-3/4-inch screw. The screw passes through a hole at the center of the rear of the flow module.



9 Use cable ties to secure installed tubing to existing wiring and tubing running behind the oven top.

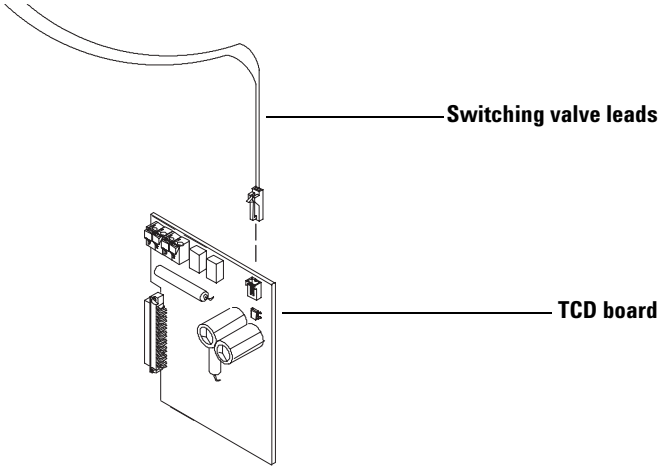
10 Refer to the 6820 *Getting Started* manual both for factory standard plumbing configurations and for proper swage techniques to connect hydrogen and air supply gases to the installed detector flow module.

Installing the Switching Valve Extension Cable

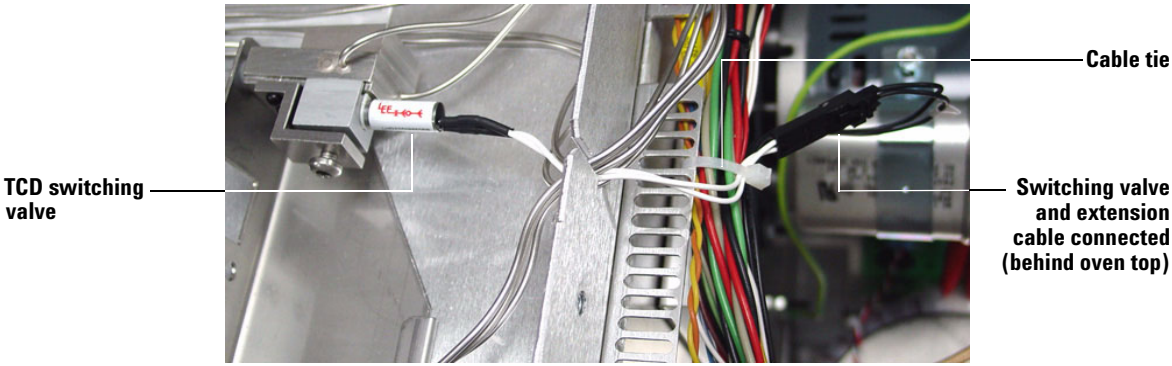
1 Route the switching valve leads and connector into the wiring and tubing area behind the oven top.

2 Connect the switching valve extension cable connector to its mating connector on the TCD board by pushing them fully together. Note that connectors are "keyed" to be joined in only

one orientation. After making the connection, verify the TCD board remains firmly seated into its main board connector.



3 Route the switching valve extension cable to the switching valve connector and join them fully together. Note that connectors are "keyed" to be joined in only one orientation.



View from right (electronics) side

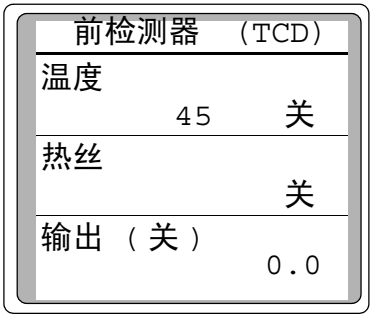
4 Use cable ties as needed to secure installed switching valve wiring to existing wiring and/or to other support points.

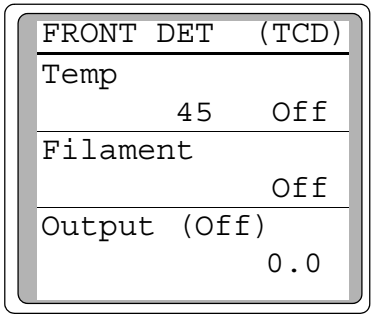
Restoring the GC to Operating Condition

1. Restore gas supplies and, following leak test procedures described in your *Maintenance and Troubleshooting* manual, check for leaks, particularly at all new connections.
2. Reinstall GC covers and panels.
3. Restore GC electrical power.
4. Switch off electrical power, then switch it on again to ensure the new configuration is properly retained in GC memory.

CAUTION Do not switch on the detector at this time. Filament damage may occur since, at this point, proper gas flow rates have not yet been established to the detector and no column has been installed.

5. Press [**前检测**] or [**后检测**] ([**Front Det**] or [**Back Det**] , respectively). If the detector has been properly installed, you will see the following display:





6. Verify detector operation by following the checkout procedure described in your *Getting Started* manual.

CAUTION Note that, when the TCD is operating, you should hear a "ticking" sound from the TCD switching valve. If you do NOT hear this sound when the detector is on, switch it off immediately to prevent filament damage and then troubleshoot and fix the problem (see your *Maintenance and Troubleshooting* manual for information).

NOTE The new TCD is packaged with insulation cups that can be assembled and installed over the column fitting, if desired.

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CAUTION

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WARNING

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